Supplementary Data

Supplemental Table 1 Online database search strategy[1].

#1 (dietary OR food OR bariatric surgery OR physical activity OR sports OR exercise) AND (weight loss OR "body weight" OR Obesity OR obese OR abdominal obesity OR adiposity OR "waist circumference" OR body mass index)
#2 ("short chain fatty acids" OR "short-chain fatty acid" OR "volatile free fatty acids" OR butyrate OR propionate OR acetate OR formate OR "butyric acid"[Title/Abstract] OR "propionic acid"[Title/Abstract] OR "acetic acid"[Title/Abstract] OR "formic acid"[Title/Abstract] OR valerate[Title/Abstract] OR "valeric acid"[Title/Abstract]) AND (Plasma OR blood OR serum OR circulation OR "systemic circulation" OR stool OR faecal OR fecal or urine)
#3 (Randomized controlled trial OR randomized clinical trial OR randomized trial OR controlled trial OR clinical trial OR intervention study OR crossover trial OR randomized controlled study OR clinical study OR randomized study OR controlled study OR "single-arm" OR "open-label") NOT (animals [mh] NOT humans [mh])

[1]#1, #2, and #3- search string 1, 2, and 3 respectively.
[2]PubMed and Web of Science = #1 AND #2 AND #3.
[3]Cochrane= #1 AND #2. Only search strings #1 and #2 were used in Cochrane.

Supplemental Table 2 Evaluation of the risk of bias in randomized controlled trials[1].

	Assessment criteria (reasons)							
Study (ref)	**Random sequence generation**	**Allocation concealment**	**Selective reporting**	**Blinding of participants and personnel**	**Blinding of outcome assessment**	**Incomplete outcome data**	**Other bias**	**Overall bias**
Benassi-Evans et al. (1)	Unclear (Not described)	Unclear (not described)	High (data for changes in SCFA concentrations were not shown, although it was reported hence cannot be included in a meta-analysis)	High (no blinding)	Low (not done, but outcome not likely to be influenced by blinding)	Unclear (no comment on drop-outs and reasons for drop-outs)	High (potential conflict of interest on the part of a co-author-Noakes)	High
Brinkworth et al. (2)	Unclear (inadequate description "participants were randomly assigned")	Unclear (not described)	Low (data on all outcomes of interest were presented)	High (no blinding)	Low (not done, but outcome not likely to be influenced by blinding)	Low (reasons for attrition in both intervention groups were provided)	Low (no other bias detected)	High
Gratz et al. (3)	Unclear (Not described)	Unclear (not described)	Low (data on all outcomes of interest were presented)	High (no blinding)	Low (not done, but outcome not likely to be influenced by blinding)	Low (outcome was reported for all study participants)	Low (no apparent form of other bias)	High
Russel et al. (4)	Unclear (Not described)	High (upon entry into the study)	Low (data on all outcomes of interest were presented)	High (no blinding)	Low (not done, but outcome not likely to be influenced)	Low (drop-out was reported and not related to study protocol)	Low (no other form of bias detected)	High
Salonen et al. (5)	Unclear (Not described)	Unclear (not described)	Low (data on all outcomes of interest were presented)	High (no blinding)	Low (not done, but outcome not likely to be influenced)	Low (drop-out was reported and not related to study protocol)	Low (no other form of bias)	High
Duncan et al. (6)	Unclear (Not described)	Unclear ("with the order randomized between participants")	Low (quote: "all collected samples were analyzed" and all outcomes were reported)	High (no blinding)	Low (not done, but outcome not likely to be influenced)	Low (drop-out was reported and not related to study protocol)	Low (no other form of bias)	High

[1] ref- reference; SCFA- short-chain fatty acid.

Supplemental Table 3 Evaluation of the risk of bias in non-randomized interventions[1].

	Assessment criteria (reasons)							
Study (ref)	**Bias due to confounding**	**Bias in selection of participants into the study**	**Bias in classification of interventions**	**Bias due to deviations from intended interventions**	**Bias due to missing data**	**Bias due to measurement of outcomes**	**Bias in selection of the reported result**	**Overall bias**
Damms-Machado et al. (7)	Moderate risk (participant assignment to the dietary and surgical interventions was based on current evidence-based guidelines)	Low risk (Selected participants were part of a multicenter clinical trial)	Low (interventions were actively assigned)	Low (no apparent deviation)	Low (no attrition, SCFA concentrations were measured in all participants at baseline and 6 and 9 months post-intervention)	Low (no blinding, but this is not likely to influence the outcome of interest, objective measurements)	Low (values of SCFA concentrations at all time-points were reported)	Moderate
Dao et al. (8)	Low (participants received the same intervention-single group assignment; baseline dietary assessment was carried out before the start of the intervention)	No information (all three related publications only mentions 'participants were recruited without describing further the method of recruitment)	Low (interventions were actively assigned)	Low (no apparent deviation)	Low (only one dropped out for personal reasons)	Low (assessment of acetate not likely to have been influenced)	Moderate (only acetate concentration was reported graphically, although NMR was used for total SCFA analysis. This was attributed however to sensitivity of NMR in detecting other components of SCFA)	Moderate
Patrone et al. (9)	Low (participants received the same intervention)	Low (participant eligibility criteria was predefined)	Low (interventions were actively assigned)	Low (no deviation)	Low (no attrition, SCFA concentrations were measured in all participants)	Low (assessment unlikely to have been influenced)	Low (all outcomes of interest were reported)	Low

[1] ref- reference; SCFA- short-chain fatty acid.

Overall risk of bias judgment

The overall risk of bias judgement for randomized controlled trials was based on the criteria provided in the Cochrane risk of bias tool for randomized controlled trials (10) ;

i. Low risk of bias – low risk of bias for all key domains

ii. Unclear risk of bias – unclear risk of bias for one or more key domains

iii. High risk of bias – high risk of bias for one or more key domains

The overall risk of bias judgement for non-randomized interventions was based the criteria in the Risk of Bias in Non-randomized Studies of Interventions (ROBINS-I) guidelines (11);

i. Low risk of bias – low risk of bias for all domains

ii. Moderate risk of bias – low or moderate risk of bias for all domains

iii. Serious risk of bias – serious risk of bias in at least one domain, but not at critical risk of bias in any domain

iv. Critical risk of bias – critical risk of bias in at least one of the domains

v. No information – lack of clear indication of a critical or serious risk of bias and also absence of information in at least one key domain

Supplemental Table 4 Full-text studies excluded from the review with reasons[1].

Reasons for exclusion		
No SCFA Study (ref)	Non-weight loss trials Study (ref)	No assessment of outcome of interest[2] Study (ref)
Gralka et al. (12)	Bottin et al. (13)	Stroeve et al. (14)
Haufe et al. (15)	Canfora et al. (16)	Tremaroli et al. (17)
Johnston et al. (18)	Daud et al. (19)	Zheng et al. (20)
Kamphuis et al. (21)	Olli et al. (22)	
Khakimov et al. (23)	Patil et al. (24)	
Kunesova et al. (25)		
Lewis et al. (26)		
Meckling et al. (27)		
Remely et al. (28)		
Yang et al. (29)		

[1]ref- reference; SCFA- short-chain fatty acid.

[2]No statistical assessment of changes in SCFA concentrations after the intervention was performed.

Supplemental References

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